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EXAMINER	
COUGHLAN, PETER D	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/627,355	**Applicant(s)** LLINAS ET AL.	
	Examiner PETER COUGHLAN	**Art Unit** 2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _11 March 2008_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _12-46_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _12-46_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _7/24/2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. This office action is in response to an AMENDMENT entered August 13, 2007 for the patent application 10/627355 filed on July 24, 2003.

2. All previous Office Actions are fully incorporated into this Non-Final Office Action by reference.

Status of Claims

3. Claims 12-46 are pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 19, 27 and 36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention. These claims state the difference between 2 clusters based on ‘higher degree of coupling’ vs. ‘lower degree of coupling.’ These is no algorithm, method or system described within the specification which illustrates which two circuits results in a ‘higher or lower coupling result. Paragraph states that ‘generally, the coupling between units inside a cluster is stronger than between units at the boundary of clusters.’ The word ‘generally’ is indefinite.

These claims need to be amended or withdrawn from consideration.

Claims 13, 21, 30, 38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claims use the term ‘phase characteristic’ which is not described in the specification. There is no mention of a ‘phase characteristic’ being composed of an ‘output signal’ of a ‘first control circuit’ which is ‘maintained relative’ of a ‘second control circuit.’

These claims must be amended or withdrawn from consideration.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Velarde, in view of Chuang. (‘Modeling inferior olive neuron dynamics’, referred to **Velarde**; ‘Cerebellar Learning for control of a two-link arm in muscle space’, referred to as **Fagg**)

Claim 12

Velarde teaches a plurality of control circuits, each control circuit comprising the following elements (**Velarde,** Fig. 1; ‘Plurality of control circuits’ of applicant is disclosed by ‘Van der Pol’, ‘FNI’ and ‘FNII’ of Velarde.) an input receiving connection for receiving an input signal (**Velarde,** Fig. 1; Each circuit within this figure can receive input from another circuit, thus containing a ‘input receiving connection’ of applicant.) an oscillation generation circuit for generating at a first output terminal an oscillation output signal having an amplitude, phase and a frequency (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘Oscillation generation circuit’ of applicant is equivalent to ‘Van der Pol’ of Velarde. The characteristics of the ‘output signal’ of applicant is disclosed by the formula ‘(1a)’ of Velarde. ‘Amplitude’ of applicant is determined by ‘α’ of Velarde.

'Frequency' of applicant is determined by 'β' of Velarde.) a first spike generation circuit in communication with the oscillation generation circuit for generating a first spike signal when the oscillation output signal crosses a first threshold value, the first spike signal being provided at the first output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'First spike generation circuit' of applicant is equivalent to 'FNI' of Velarde. 'Output signal crosses a first threshold value' of applicant is disclosed by equation '(1b)' with properties of g(w) of Velarde.) a second spike generation circuit in communication with the oscillation generation circuit for generating a second spike signal when the oscillation output signal crosses a second threshold value, the second spike signal being provided at the first output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Second spike generation circuit' of applicant is equivalent to 'FNII' of Velarde. 'Output signal crosses a second threshold value' of applicant is disclosed by equation '(1c)' with properties of f(u) of Velarde.) wherein the oscillation output signal, the first spike signal and the second spike signal collectively form a composite output signal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Composite output signal' of applicant is equivalent to the output of 'FNII' of Velarde.)

Velarde does not teach which is capable of controlling an actuating element, and wherein characteristic information of the actuating element is provided as part of the input signal to the control circuit.

Fagg teaches which is capable of controlling an actuating element, and wherein characteristic information of the actuating element is provided as part of the input signal to the control circuit. (**Fagg,** p2638, C2:11 through p2639, C1:21; Controlling an

'actuating element' of applicant is equivalent to 'planer arm' of Fagg. 'Characteristic information' as 'part of the input signal to the control circuit' of applicant is disclosed by the inferior olive function as estimating movement errors which are then used to update the APG of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Velarde by using feedback as input as taught by Fagg to have which is capable of controlling an actuating element, and wherein characteristic information of the actuating element is provided as part of the input signal to the control circuit.

For the purpose of having current positioning parameters as input to determine future positioning motion

Velarde teaches to thereby adjust one of the amplitude, phase and frequency of the oscillation output signal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Adjusting the amplitude and frequency of applicant is accomplished by changing the variables of 'α' and 'β' of Velarde.)

Claim 13

Velarde teaches wherein a phase characteristic of the composite output signal of a first control circuit is maintained at a predetermined level relative to a phase characteristic of the composite output signal of a second control circuit. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Characteristic of the composite output signal of a first control circuit is maintained at a predetermined level' of applicant is disclosed by 'autonomous subthreshold activity, weakly chaotic oscillations (by "weakly chaotic" we

mean periodic, almost regular oscillatory dynamics with mean periodic, almost regular oscillatory dynamics with however still positive value of the biggest Lyapunov exponent) with the frequency from 5-8 Hz' of Velarde.)

Claim 14

Velarde teaches at least one coupling element for coupling adjacent control circuits. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Coupling element between adjacent control elements' of applicant is equivalent to 'the parameter h determines the strength of the coupling between the two FN subsystems' of Velarde.)

Claim 15

Velarde teaches wherein the coupling element comprises a variable impedance element. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Per Velarde, 'the parameter h determines the strength of the coupling between the two FN subsystems.' Per Velarde, x, y, w and z are variables. In equation (1c) the product hw is displayed. 'Variable impedance variable' of applicant is equivalent to 'w' of Velarde.)

Claim 16

Velarde teaches a plurality of coupling elements, each coupling element connected to two adjacent control circuits to thereby provide coupling between the two adjacent control circuits. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Coupling

elements' between 'control circuits' of applicant is illustrated by the connections between Van der Pol, FNI and FNII of Velarde.)

Claim 17

Velarde teaches wherein the impedance of the coupling elements is altered to thereby modify synchronization between coupled control circuits. (**Velarde,** p7, C2:54 through p9, C1:5; 'Modify synchronization between coupled circuits' of applicant is illustrated by applying a standard procedure to 'determine time delay' in order for 'reconstruction of an attractor from the modeled oscillations' of Velarde.)

Claim 18

Velarde does not teach a command input for controlling the coupling between control circuits.

Fagg teaches a command input for controlling the coupling between control circuits. (**Fagg,** p2638, C2:11 through p2639, C1:21; 'Command input' of applicant is equivalent to the 'adjustable pattern generators each of which drive a single muscle' of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Velarde by being able to connect and disconnect circuits for control as taught by Fagg to have a command input for controlling the coupling between control circuits.

For the purpose of performing actual movement of an actuator.

Claim 19

Velarde teaches a first cluster of control circuits and a second cluster of control circuits, the first cluster of control circuits being characterized by a higher degree of coupling between control circuits of the first cluster relative to a lower degree of coupling between control circuits of the first cluster and control circuits of the second cluster. (**Velarde,** p7, C2:54 through p9, C1:5; The 'higher degree' of clustering within the first control circuit ids displayed by the 'almost regular oscillatory dynamics' of the 'Van der Pol' circuit of Velarde. 'Lower degree of coupling' of applicant is illustrated by the 'rhythmic generation of action potentials' of Velarde)

Claim 20

Velarde teaches a plurality of control circuits, each control circuit comprising the following elements (**Velarde,** Fig. 1; 'Plurality of control circuits' of applicant is disclosed by 'Van der Pol', 'FNI' and 'FNII' of Velarde.) an input receiving connection for receiving an input signal (**Velarde,** Fig. 1; Each circuit within this figure can receive input from another circuit, thus containing a 'input receiving connection' of applicant.) an oscillation generation circuit for generating at a first output terminal and a second output terminal an oscillation output signal having an amplitude, phase and a frequency (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Oscillation generation circuit' of applicant is equivalent to 'Van der Pol' of Velarde. The characteristics of the 'output signal' of applicant is disclosed by the formula '(1a)' of Velarde. 'Amplitude' of applicant is determined by 'α' of Velarde. 'Frequency' of applicant is determined by 'β' of Velarde.) a first spike

generation circuit in communication with the oscillation generation circuit for generating a first spike signal when the oscillation output signal crosses a first threshold value, the first spike signal being provided at the first output terminal and the second output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'First spike generation circuit' of applicant is equivalent to 'FNI' of Velarde. 'Output signal crosses a first threshold value' of applicant is disclosed by equation '(1b)' with properties of g(w) of Velarde.) a second spike generation circuit in communication with the oscillation generation circuit for generating a second spike signal when the oscillation output signal crosses a second threshold value, the second spike signal being provided at the first output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Second spike generation circuit' of applicant is equivalent to 'FNII' of Velarde. 'Output signal crosses a second threshold value' of applicant is disclosed by equation '(1c)' with properties of f(u) of Velarde.) wherein the oscillation output signal, the first spike signal and the second spike signal collectively form a first composite output signal at the first output terminal, and the oscillation output signal and the first spike signal collectively form a second composite output signal at the second output terminal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Composite output signal' of applicant is equivalent to the output of 'FNII' of Velarde.)

Velarde does not teach such that at least one of the composite output signals is capable of controlling an actuating element, and wherein characteristic information of the actuating element is provided as part of the input signal to the control circuit.

Fagg teaches such that at least one of the composite output signals is capable of controlling an actuating element, and wherein characteristic information of the actuating element is provided as part of the input signal to the control circuit. (**Fagg,** p2638, C2:11 through p2639, C1:21; Controlling an ‘actuating element’ of applicant is equivalent to ‘planer arm’ of Fagg. ‘Characteristic information’ as ‘part of the input signal to the control circuit’ of applicant is disclosed by the inferior olive function as estimating movement errors which are then used to update the APG of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Velarde by using feedback as input as taught by Fagg to have such that at least one of the composite output signals is capable of controlling an actuating element, and wherein characteristic information of the actuating element is provided as part of the input signal to the control circuit.

For the purpose of having current positioning parameters as input to determine future positioning motion

Velarde teaches to thereby adjust one of the amplitude, phase and frequency of the oscillation output signal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Adjusting the amplitude and frequency of applicant is accomplished by changing the variables of ‘α’ and ‘β’ of Velarde.)

Claim 21

Velarde teaches wherein a phase characteristic of the composite output signal of a first control circuit is maintained at a predetermined level relative to a phase

characteristic of the composite output signal of a second control circuit. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘Characteristic of the composite output signal of a first control circuit is maintained at a predetermined level’ of applicant is disclosed by ‘autonomous subthreshold activity, weakly chaotic oscillations (by “weakly chaotic” we mean periodic, almost regular oscillatory dynamics with mean periodic, almost regular oscillatory dynamics with however still positive value of the biggest Lyapunov exponent) with the frequency from 5-8 Hz’ of Velarde.)

Claim 22

Velarde teaches at least one coupling element for coupling adjacent control circuits. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘Coupling element between adjacent control elements’ of applicant is equivalent to ‘the parameter h determines the strength of the coupling between the two FN subsystems’ of Velarde.)

Claim 23

Velarde teaches wherein the coupling element comprises a variable impedance element. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Per Velarde, ‘the parameter h determines the strength of the coupling between the two FN subsystems.’ Per Velarde, x, y, w and z are variables. In equation (1c) the product hw is displayed. ‘Variable impedance variable’ of applicant is equivalent to ‘w’ of Velarde.)

Claim 24

Velarde teaches a plurality of coupling elements, each coupling element connected to two adjacent control circuits to thereby provide coupling between the two adjacent control circuits. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Coupling elements' between 'control circuits' of applicant is illustrated by the connections between Van der Pol, FNI and FNII of Velarde.)

Claim 25

Velarde teaches wherein the impedance of the coupling elements is altered to thereby modify synchronization between coupled control circuits. (**Velarde,** p7, C2:54 through p9, C1:5; 'Modify synchronization between coupled circuits' of applicant is illustrated by applying a standard procedure to 'determine time delay' in order for 'reconstruction of an attractor from the modeled oscillations' of Velarde.)

Claim 26

Velarde does not teach a command input for controlling the coupling between control circuits.

Fagg teaches a command input for controlling the coupling between control circuits. (**Fagg,** p2638, C2:11 through p2639, C1:21; 'Command input' of applicant is equivalent to the 'adjustable pattern generators each of which drive a single muscle' of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Velarde by being able to connect and

disconnect circuits for control as taught by Fagg to have a command input for controlling the coupling between control circuits.

For the purpose of performing actual movement of an actuator.

Claim 27

Velarde teaches a first cluster of control circuits and a second cluster of control circuits, the first cluster of control circuits being characterized by a higher degree of coupling between control circuits of the first cluster relative to a lower degree of coupling between control circuits of the first cluster and control circuits of the second cluster. (**Velarde,** p7, C2:54 through p9, C1:5; The 'higher degree' of clustering within the first control circuit ids displayed by the 'almost regular oscillatory dynamics' of the 'Van der Pol' circuit of Velarde. 'Lower degree of coupling' of applicant is illustrated by the 'rhythmic generation of action potentials' of Velarde)

Claim 28

Velarde teaches a plurality of control circuits, each control circuit comprising the following elements(**Velarde,** Fig. 1; 'Plurality of control circuits' of applicant is disclosed by 'Van der Pol', 'FNI' and 'FNII' of Velarde.) an input receiving connection for receiving an input signal (**Velarde,** Fig. 1; Each circuit within this figure can receive input from another circuit, thus containing a 'input receiving connection' of applicant.) an oscillation generation circuit for generating at a first output terminal an oscillation output signal having an amplitude, phase and a frequency (**Velarde,** Fig. 1, p6, C1:1 through p7,

C1:15; ‘Oscillation generation circuit’ of applicant is equivalent to ‘Van der Pol’ of Velarde. The characteristics of the ‘output signal’ of applicant is disclosed by the formula ‘(1a)’ of Velarde. ‘Amplitude’ of applicant is determined by ‘α’ of Velarde. ‘Frequency’ of applicant is determined by ‘β’ of Velarde.) a first spike generation circuit in communication with the oscillation generation circuit for generating a first spike signal when the oscillation output signal crosses a first threshold value, the first spike signal being provided at the first output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘First spike generation circuit’ of applicant is equivalent to ‘FNI’ of Velarde. ‘Output signal crosses a first threshold value’ of applicant is disclosed by equation ‘(1b)’ with properties of g(w) of Velarde.) a second spike generation circuit in communication with the oscillation generation circuit for generating a second spike signal when the oscillation output signal crosses a second threshold value, the second spike signal being provided at the first output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘First spike generation circuit’ of applicant is equivalent to ‘FNII’ of Velarde. ‘Output signal crosses a second threshold value’ of applicant is disclosed by equation ‘(1c)’ with properties of f(u) of Velarde.) wherein the oscillation output signal, the first spike signal and the second spike signal collectively form a composite output signal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘Composite output signal’ of applicant is equivalent to the output of ‘FNII’ of Velarde.)

Velarde does not teach which is capable of controlling an actuating element, and wherein a sensor is used to obtain characteristic information of the actuating element

such that the characteristic information is provided as part of the input signal to the control circuit.

Fagg teaches which is capable of controlling an actuating element, and wherein a sensor is used to obtain characteristic information of the actuating element such that the characteristic information is provided as part of the input signal to the control circuit. (**Fagg,** p2638, C2:11 through p2639, C1:21; Controlling an ‘actuating element’ of applicant is equivalent to ‘planer arm’ of Fagg. ‘Characteristic information’ as ‘part of the input signal to the control circuit’ of applicant is disclosed by the inferior olive function as estimating movement errors which are then used to update the APG of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Velarde by using feedback as input as taught by Fagg to have which is capable of controlling an actuating element, and wherein a sensor is used to obtain characteristic information of the actuating element such that the characteristic information is provided as part of the input signal to the control circuit.

For the purpose of having current positioning parameters as input to determine future positioning motion

Velarde teaches to thereby adjust one of the amplitude, phase and frequency of the oscillation output signal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Adjusting the amplitude and frequency of applicant is accomplished by changing the variables of ‘α’ and ‘β’ of Velarde.)

Velarde does not teach wherein the input signal is used to synchronize controlled movement of the actuation elements.

Fagg teaches wherein the input signal is used to synchronize controlled movement of the actuation elements. (**Fagg,** abstract; 'Synchronize controlled movements' of applicant is illustrated by 'the model learns in a trial and error fashion to produce bursts of muscle activity that accurately bring the arm to a specific target' of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Velarde by coordinating movement of an actuator as taught by Fagg to have wherein the input signal is used to synchronize controlled movement of the actuation elements.

For the purpose of the actuator being able to perform a specific task.

Claim 29

Velarde teaches using a plurality of control circuits, each control circuit performing the following steps (**Velarde,** Fig. 1; 'Plurality of control circuits' of applicant is disclosed by 'Van der Pol', 'FNI' and 'FNII' of Velarde.) receiving an input signal at an input receiving connection (**Velarde,** Fig. 1; Each circuit within this figure can receive input from another circuit, thus containing a 'input receiving connection' of applicant.) generating at a first output terminal an oscillation output signal having an amplitude and a frequency (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Oscillation output signal' of applicant is equivalent to 'Van der Pol' of Velarde. The characteristics of the 'output signal' of applicant is disclosed by the formula '(1a)' of Velarde. 'Amplitude' of applicant is determined by 'α' of Velarde. 'Frequency' of applicant is determined by 'β' of Velarde.) generating a first spike signal when the oscillation output signal crosses a first threshold

value, the first spike signal being provided at the first output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'First spike generation circuit' of applicant is equivalent to 'FNI' of Velarde. 'Output signal crosses a first threshold value' of applicant is disclosed by equation '(1b)' with properties of g(w) of Velarde.) generating a second spike signal when the oscillation output signal crosses a second threshold value, the second spike signal being provided at the first output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'First spike generation circuit' of applicant is equivalent to 'FNII' of Velarde. 'Output signal crosses a second threshold value' of applicant is disclosed by equation '(1c)' with properties of f(u) of Velarde.) wherein the oscillation output signal, the first spike signal and the second spike signal collectively form a composite output signal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Composite output signal' of applicant is equivalent to the output of 'FNII' of Velarde.)

Velarde does not teach which is capable of controlling an actuating element, and further comprising the step of obtaining characteristic information of the actuating element which is provided as part of the input signal to the control circuit.

Fagg teaches which is capable of controlling an actuating element, and further comprising the step of obtaining characteristic information of the actuating element which is provided as part of the input signal to the control circuit. (**Fagg,** p2638, C2:11 through p2639, C1:21; Controlling an 'actuating element' of applicant is equivalent to 'planer arm' of Fagg. 'Characteristic information' as 'part of the input signal to the control circuit' of applicant is disclosed by the inferior olive function as estimating movement errors which are then used to update the APG of Fagg.) It would have been obvious to a

person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Velarde by using feedback as input as taught by Fagg to have which is capable of controlling an actuating element, and further comprising the step of obtaining characteristic information of the actuating element which is provided as part of the input signal to the control circuit.

For the purpose of having current positioning parameters as input to determine future positioning motion

Velarde teaches to thereby adjust one of the amplitude, phase and frequency of the oscillation output signal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Adjusting the amplitude and frequency of applicant is accomplished by changing the variables of 'α' and 'β' of Velarde.)

Claim 30

Velarde teaches wherein a phase characteristic of the composite output signal of a first control circuit is maintained relative to a phase characteristic of the composite output signal of a second control circuit. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Characteristic of the composite output signal of a first control circuit is maintained at a predetermined level' of applicant is disclosed by 'autonomous subthreshold activity, weakly chaotic oscillations (by "weakly chaotic" we mean periodic, almost regular oscillatory dynamics with mean periodic, almost regular oscillatory dynamics with however still positive value of the biggest Lyapunov exponent) with the frequency from 5-8 Hz' of Velarde.)

Claim 31

Velarde teaches the step of using at least one coupling element for coupling adjacent control circuits. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘Coupling element between adjacent control elements’ of applicant is equivalent to ‘the parameter h determines the strength of the coupling between the two FN subsystems’ of Velarde.)

Claim 32

Velarde teaches wherein the coupling element comprises a variable impedance element. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Per Velarde, ‘the parameter h determines the strength of the coupling between the two FN subsystems.’ Per Velarde, x, y, w and z are variables. In equation (1c) the product hw is displayed. ‘Variable impedance variable’ of applicant is equivalent to ‘w’ of Velarde.)

Claim 33

Velarde teaches the step of using a plurality of coupling elements, each coupling element connected to two adjacent control circuits to thereby provide coupling between the two adjacent control circuits. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘Coupling elements’ between ‘control circuits’ of applicant is illustrated by the connections between Van der Pol, FNI and FNII of Velarde.)

Claim 34

Velarde teaches the step of altering the impedance to thereby modify synchronization between coupled control circuits. (**Velarde,** p7, C2:54 through p9, C1:5; ‘Modify synchronization between coupled circuits’ of applicant is illustrated by applying a standard procedure to ‘determine time delay’ in order for ‘reconstruction of an attractor from the modeled oscillations’ of Velarde.)

Claim 35

Velarde does not teach the step of applying a command input for controlling the coupling between control circuits.

Fagg teaches the step of applying a command input for controlling the coupling between control circuits. (**Fagg,** p2638, C2:11 through p2639, C1:21; ‘Command input’ of applicant is equivalent to the ‘adjustable pattern generators each of which drive a single muscle’ of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Velarde by being able to connect and disconnect circuits for control as taught by Fagg to have the step of applying a command input for controlling the coupling between control circuits.

For the purpose of performing actual movement of an actuator.

Claim 36

Velarde teaches the step of creating a first cluster of control circuits and a second cluster of a control circuits, the first cluster of control circuits being characterized by a higher degree of coupling between control circuits of the first cluster relative to a

lower degree of coupling between control circuits of the first cluster and control circuits of the second cluster. (**Velarde,** p7, C2:54 through p9, C1:5; The ‘higher degree’ of clustering within the first control circuit ids displayed by the ‘almost regular oscillatory dynamics’ of the ‘Van der Pol’ circuit of Velarde. ‘Lower degree of coupling’ of applicant is illustrated by the ‘rhythmic generation of action potentials’ of Velarde)

Claim 37

Velarde teaches using a plurality of control circuits, each control circuit performing the following steps: receiving an input signal at an input receiving connection (**Velarde,** Fig. 1; ‘Plurality of control circuits’ of applicant is disclosed by ‘Van der Pol’, ‘FNI’ and ‘FNII’ of Velarde.) generating at a first output terminal and at a second output terminal (**Velarde,** Fig. 1; The ‘first output terminal’ of applicant is equivalent to the output of the ‘FNI’ module of Velarde. The ‘second output terminal of applicant is equivalent to the output of the ‘FNII’ module of Velarde.) an oscillation output signal having amplitude, phase and a frequency (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘Oscillation output signal’ of applicant is equivalent to ‘Van der Pol’ of Velarde. The characteristics of the ‘output signal’ of applicant is disclosed by the formula ‘(1a)’ of Velarde. ‘Amplitude’ of applicant is determined by ‘α’ of Velarde. ‘Frequency’ of applicant is determined by ‘β’ of Velarde.) generating a first spike signal when the oscillation output signal crosses a first threshold value, the first spike signal being provided at the first output terminal and the second output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘First spike generation circuit’ of applicant is equivalent to ‘FNI’

of Velarde. ‘Output signal crosses a first threshold value’ of applicant is disclosed by equation ‘(1b)’ with properties of g(w) of Velarde.) generating a second spike signal when the oscillation output signal crosses a second threshold value, the second spike signal being provided at the first output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘First spike generation circuit’ of applicant is equivalent to ‘FNII’ of Velarde. ‘Output signal crosses a second threshold value’ of applicant is disclosed by equation ‘(1c)’ with properties of f(u) of Velarde.) wherein the oscillation output signal, the first spike signal and the second spike signal collectively form a composite output signal at the first output terminal, and the oscillation output signal and the first spike signal collectively form a second composite output signal at the second output terminal (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; ‘Composite output signal’ of applicant is equivalent to the output of ‘FNII’ of Velarde.),

Velarde does not teach such that at least one of the composite output signals is capable of controlling an actuating element, and further comprising the step of obtaining characteristic information of the actuating element which is provided as part of the input signal to the control circuit.

Fagg teaches such that at least one of the composite output signals is capable of controlling an actuating element, and further comprising the step of obtaining characteristic information of the actuating element which is provided as part of the input signal to the control circuit. (**Fagg,** p2638, C2:11 through p2639, C1:21; Controlling an ‘actuating element’ of applicant is equivalent to ‘planer arm’ of Fagg. ‘Characteristic information’ as ‘part of the input signal to the control circuit’ of applicant is disclosed by

the inferior olive function as estimating movement errors which are then used to update the APG of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Velarde by using feedback as input as taught by Fagg to have such that at least one of the composite output signals is capable of controlling an actuating element, and further comprising the step of obtaining characteristic information of the actuating element which is provided as part of the input signal to the control circuit.

For the purpose of having current positioning parameters as input to determine future positioning motion

Velarde teaches to thereby adjust one of the amplitude, phase and frequency of the oscillation output signal. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Adjusting the amplitude and frequency of applicant is accomplished by changing the variables of 'α' and 'β' of Velarde.)

Claim 38

Velarde teaches wherein a phase characteristic of the composite output signal of a first control circuit is maintained relative to a phase characteristic of the composite output signal of a second control circuit. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Characteristic of the composite output signal of a first control circuit is maintained at a predetermined level' of applicant is disclosed by 'autonomous subthreshold activity, weakly chaotic oscillations (by "weakly chaotic" we mean periodic, almost regular oscillatory dynamics with mean periodic, almost regular oscillatory dynamics with

however still positive value of the biggest Lyapunov exponent) with the frequency from 5-8 Hz' of Velarde.)

Claim 39

Velarde teaches the step of using at least one coupling element for coupling adjacent control circuits. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Coupling element between adjacent control elements' of applicant is equivalent to 'the parameter h determines the strength of the coupling between the two FN subsystems' of Velarde.)

Claim 40

Velarde teaches the coupling element comprises a variable impedance element. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; Per Velarde, 'the parameter h determines the strength of the coupling between the two FN subsystems.' Per Velarde, x, y, w and z are variables. In equation (1c) the product hw is displayed. 'Variable impedance variable' of applicant is equivalent to 'w' of Velarde.)

Claim 41

Velarde teaches the step of using a plurality of coupling elements, each coupling element connected to two adjacent control circuits to thereby provide coupling between the two adjacent control circuits. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15; 'Coupling elements' between 'control circuits' of applicant is illustrated by the connections between Van der Pol, FNI and FNII of Velarde.)

Claim 42

Velarde teaches the step of altering the impedance to thereby modify synchronization between coupled control circuits. (**Velarde,** p7, C2:54 through p9, C1:5; 'Modify synchronization between coupled circuits' of applicant is illustrated by applying a standard procedure to 'determine time delay' in order for 'reconstruction of an attractor from the modeled oscillations' of Velarde.)

Claim 43

Velarde does not teach the step of applying a command input for controlling the coupling between control circuits.

Fagg teaches the step of applying a command input for controlling the coupling between control circuits. (**Fagg,** p2638, C2:11 through p2639, C1:21; 'Command input' of applicant is equivalent to the 'adjustable pattern generators each of which drive a single muscle' of Fagg.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Velarde by being able to connect and disconnect circuits for control as taught by Fagg to have the step of applying a command input for controlling the coupling between control circuits.

For the purpose of performing actual movement of an actuator.

Claim 44

Velarde teaches the step of creating a first cluster of control circuits and a second cluster of a control circuits, the first cluster of control circuits being characterized by a higher degree of coupling between control circuits of the first cluster relative to a lower degree of coupling between control circuits of the first cluster and control circuits of the second cluster. (**Velarde,** p7, C2:54 through p9, C1:5; The ‘higher degree’ of clustering within the first control circuit ids displayed by the ‘almost regular oscillatory dynamics’ of the ‘Van der Pol’ circuit of Velarde. ‘Lower degree of coupling’ of applicant is illustrated by the ‘rhythmic generation of action potentials’ of Velarde)

Claim 45

Velarde teaches wherein the first spike generation circuit generates the first spike signal at a peak of the oscillation output signal. (**Velarde,** p7, C2:11-53; ‘Generates the first spike at a peak of the oscillation output signal’ of applicant is equivalent to ‘action potential is generated only at voltages near the peak of the oscillation’ of Velarde.)

Claim 46

Velarde teaches wherein the first spike signal and the second spike signal have different amplitudes. (**Velarde,** p6, C2:20 through p7 C1:15; The ‘different amplitudes’ of applicant are indicated with f(u) and g(w) of Velarde. Since f(u) and g(w) have different parameters, these have different amplitudes.)

Response to Arguments

5. Applicant's arguments filed on August 13, 2007 for claims 12-46 have been fully considered but are not persuasive.

6. In reference to the Applicant's argument:

REMARKS

Claims 12-46 were previously pending in this application. Claims 12, 13, 20, 21, 28, 29, 30, 37 and 38 have been amended. No new matter has been added.

Applicants present the following remarks in response to the issues raised in the August 13, 2007 Final Office Action. Although the present claims have been amended, applicants will respond to the issues raised in the previous Office Action to the extent that they are relevant to the presently amended claims.

Claim Rejections - 35 U.S.C. § 112, First Paragraph and Second Paragraph

Claims 12, 20, 28, 29 and 37 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement for reciting a connection used for receiving an input. The Examiner contends that there are no specific "connections" mentioned in the specification for receiving "input signals." Applicants respectfully disagree, and direct the Examiner's attention to Paragraph 63 of the instant application which states that there is an "input" to the circuit model of the invention which represents certain signals. Furthermore, Paragraph 88 of the application recites "inputs" which are used to control certain elements shown in the circuit implementation of the invention illustrated in Figure 10. Additionally, Paragraph 93 of the application similarly recites that there is a voltage applied at either a first control input or a second control input. Moreover, it is stated that the inputs are used to "couple" the illustrated circuit to other circuits. Also, Paragraph 120 of the application refers to the "input" of the illustrated circuit implementation of Figure 15. Continuing, Paragraph 121 of the application recites "inputs [which] comprise sensory signals indicating the states of the actuation elements". Thus, there is ample description in the specification of "inputs". If the Examiner's contention is that the word "connection" is not explicitly recited for

describing how a signal is applied to an "input", applicants respond that the term "connection" is so notoriously well known and universally understood. How else can a signal be applied to an "input" if it is not "connected" somehow? In fact, the present application, as discussed above, refers to coupling of inputs. It is respectfully submitted, that coupling and connecting are quite similar, and again, notoriously well known. It is respectfully requested that this rejection be withdrawn.

Examiner's response:

Considering the applicant's arguments concerning the issue of 'inputs', the Examiner withdraws the rejection.

7. In reference to the Applicant's argument:

Claims 19, 27 and 36 stand rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement for reciting the clustering of circuits based on a higher degree of coupling, or a lower degree of coupling. These claims also stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite since, according to the Examiner, there is no way to ascertain what is a higher degree of coupling and what is a lower degree of coupling. The Examiner also states that there is no description in the specification which illustrates which two circuits result in higher or lower coupling. In response, applicants direct the Examiner's attention to Paragraph 189 which states that the coupling between units inside a cluster is stronger than between units at the boundary of clusters. Additionally, with respect to the indefiniteness issue, applicants point out that the coupling properties are relativistic in the sense that the coupling between units of a cluster as opposed to between units of different clusters is higher for the former as compared to the latter. Accordingly, applicants request that these rejections be withdrawn.

Examiner's response:

In light of the applicant's argument written description within ¶0189, the Examiner withdraws the rejection.

Concerning indefinite with these claim ¶0189 states ‘generally, the coupling between units inside a cluster is stronger than between units at the boundary of clusters.’ The word ‘generally’ is indefinite. Office Action stands.

8. In reference to the Applicant’s argument:

Claims 12, 20, 28, 29 and 37 stand rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement, since they use the term "oscillation generation circuit", which according to the Examiner there is "no mention of' in the application. In response, applicants direct the Examiner's attention to Paragraphs 62 and 63 of the present application which disclose a quasi-sinusoidal signal generator (element 11, Figure 3). It is respectfully submitted that a sinusoidal or a quasi-sinusoidal signal is an oscillatory type of signal. This is a fundamental aspect of engineering and signal processing. The Examiner goes on to state that although this is mentioned in Paragraph 62, it is only mentioned in connection with an actual inferior olive neuron. However, Paragraph 62 refers to the "neuron model" of the present invention, not an actual neuron as suggested by the Examiner. Additionally, Paragraph 63 refers to the neuron model, as illustrated in the block diagram of Figure 3. Contrary to the Examiner's contention, this description in the specification is not directed to "an actual inferior olive neuron" as stated in the Office Action. Accordingly, it is respectfully requested that this rejection be withdrawn.

Examiner’s response:

With the admission of ‘that a sinusoidal or a quasi-sinusoidal signal is an oscillatory type of signal' By the applicant, the Examiner withdraws the rejection.

9. In reference to the Applicant’s argument:

Claims 13, 21, 30 and 38 stand rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement, since they use the term "phase characteristic", which the Examiner contends is not described in the specification in connection with the phase characteristic of an output of one circuit being maintained relative to a phase characteristic of an output of a second circuit. Additionally, these claims stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite since, according to the Examiner, "maintained relative" has no meaning and the specification is silent as to any meaning for this term. In response, applicants direct the Examiner's attention to Paragraph 194 of the present application which discusses phase synchronization among units. Accordingly, applicants respectfully request that this rejection be withdrawn.

Examiner’s response:

The Examiner withdraws the rejection based on the applicant arguments.

10. In reference to the Applicant’s argument:

Claims 12, 20, 28, 29 and 37 stand rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement, since they use the term "characteristic information" in connection with the actuating elements, which according to the Examiner is not mentioned in the specification. In response, applicants direct the Examiner's attention to Paragraph 121 of the present application which states that the "inputs... comprise sensory signals indicating the states of the actuation elements". Thus, the specification here says "states of the actuation elements. The claims state "characteristic information of the actuating elements". A "state" of an actuation element, is by definition a "characteristic" of the actuating element. Accordingly, applicants submit that the term "characteristic information of the actuating element" is adequately described and supported in the specification, and request that this rejection be withdrawn.

Examiner’s response:

In light of the applicant explanation in which the ‘characteristic information’ can be see as feedback, the Examiner withdraws the rejection.

11. In reference to the Applicant’s argument:

Claim 28 stands rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement, since it uses the term "synchronize controlled" in connection with the movement of the actuation elements, which the Examiner contends is not mentioned in the specification. In response, applicants direct the Examiner's attention to Paragraph 128 of the application which discusses how the present invention can control actuators to "actuate in a regular, alternating pattern". Furthermore, paragraph 138 in discussing the olivo-cerebellar system which the present invention operates similar to, states that it provides the ability to work in "synchrony". Also, Paragraph 194 states that there is "synchronization among units". Accordingly, applicants respectfully request that this rejection be withdrawn.

Examiner’s response:

The rejection is withdrawn in light of the applicant argument, the Examiner withdraws the rejection.

12. In reference to the Applicant’s argument:

Claim Rejections - 35 U.S.C. § 103(a)

Claims 12-46 were previously rejected under 35 U.S.C. § 103(a) as being unpatentable over Maass, "Pulsed Neural Networks" ("Maass") in view of Kawato, "A computational model for four regions of the cerebellum based on feedback error learning." ("Kawato"). Applicants will respond to this rejection in light of the present amendments to the claims.

According to the Examiner, Maass teaches all the elements of previous claim 12, except for the oscillation output signal and the first and second spike signals, collectively forming a composite output signal which is capable of controlling an actuating element

and wherein characteristic information of the actuating element is provided as part of the input signal to the control circuit.

Applicants respectfully submit that claim 12, as amended, is patentable over the cited references. Claim 12, and the other independent claims in this application, have been amended to better recite certain aspects of the present invention. Specifically, the independent claims have been amended to recite that the spike generation occurs when either of two threshold levels is crossed by the oscillatory signal. According to the present invention, when the oscillatory signal crosses a first (or high) threshold, a first spike signal is generated. Similarly, when the oscillatory signal crosses a second (or low) threshold, a second spike signal is generated. Thus, the composite output signal is the oscillatory signal along with first or second spike signals as they occur, i.e., when the oscillatory signal crosses the first or second thresholds, respectively. Moreover, the claims have been amended to indicate that the input signals to the circuit are used to adjust either the amplitude, phase or frequency of the oscillatory signal, and therefore affect when the oscillatory signal reaches either threshold, thus affecting the generation of either the first or second spike signals.

The invention of the presently amended claims is not found in the combination of references cited by the Examiner in the previous Office Action. Specifically, the cited references fail to disclose an oscillatory circuit with two thresholds--both a high threshold and a low threshold, where the crossing of either threshold by the oscillatory signal results in the generation of a spike signal. Additionally, Figure 2.12 of Maass which is relied on by the Examiner illustrates what appears to be a logical gate representation of a neural network. It appears from Figure 2.12 that the "layer 1" structures are somehow arranged in series with the "layer 2" structures. The cited reference does not disclose a two threshold oscillatory circuit, as presented in the amended claims of the present application.

With respect to the cited Kawato reference ("A computational model for four regions of the cerebellum based on feedback error learning."), applicants submit that this reference does not disclose an oscillator output signal. Rather, and with reference to Equation 2.1, and the corresponding description (p. 96), Kawato discloses a feedback error learning approach, where the feedback motor command, tao-sub c, is summed with an error correction signal or feedforward command, tao-sub n, to create the control signal for the controlled object. The feedforward command, Tn, is in turn presented by Equation 2. I and is indicated as being a function of the desired trajectory, Od, and a coefficient/strength of coupling parameter, w. Thus, Kawato presents a somewhat iterative feedback/error correction type of control algorithm, which does not utilize oscillatory signals. In contrast, the present invention is directed to a control system and method which uses an oscillatory signal coupled with spike signals to control an actuating element. Characteristic information about the status of the actuating element is then used to adjust the amplitude, phase or frequency of the oscillatory output control signal. Kawato does not disclose such an oscillatory-type control system or method.

Examiner's response:

Maass and Kawato are no longer used as references. Fagg and Velarde are used as references under 35 U.S.C. §103. 'Plurality of control circuits' of applicant is disclosed by 'Van der Pol', 'FNI' and 'FNII' of Velarde. (**Velarde,** Fig. 1) Each circuit within this figure can receive input from another circuit, thus containing a 'input receiving connection' of applicant. (**Velarde,** Fig. 1) 'Oscillation generation circuit' of applicant is equivalent to 'Van der Pol' of Velarde. The characteristics of the 'output signal' of applicant is disclosed by the formula '(1a)' of Velarde. 'Amplitude' of applicant is determined by 'α' of Velarde. 'Frequency' of applicant is determined by 'β' of Velarde. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15) 'First spike generation circuit' of applicant is equivalent to 'FNI' of Velarde. 'Output signal crosses a first threshold value' of applicant is disclosed by equation '(1b)' with properties of g(w) of Velarde. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15) 'Second spike generation circuit' of applicant is equivalent to 'FNII' of Velarde. 'Output signal crosses a second threshold value' of applicant is disclosed by equation '(1c)' with properties of f(u) of Velarde. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15) 'Composite output signal' of applicant is equivalent to the output of 'FNII' of Velarde. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15) Controlling a 'actuating element' of applicant is equivalent to 'planer arm' of Fagg. 'Characteristic information' as 'part of the input signal to the control circuit' of applicant is disclosed by the inferior olive function as estimating movement errors which are then used to update the APG of Fagg. (**Fagg,** p2638, C2:11 through p2639, C1:21) Adjusting the amplitude

and frequency of applicant is accomplished by changing the variables of 'α' and 'β' of Velarde. (**Velarde,** Fig. 1, p6, C1:1 through p7, C1:15;) Office Action stands.

Examination Considerations

13. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has the full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

14. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and sprit of compact prosecution. However, and

unless otherwise stated, the Examiner's Notes are not prior art but link to prior art that one of ordinary skill in the art would find inherently appropriate.

15. Examiner's Opinion: Paragraphs 13 and 14 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

Conclusion

16. The prior art of record and not relied upon is considered pertinent to the applicant's disclosure.

-U. S. Patent Publication 20030176905: Nicolelis

-U. S. Patent Publication 20030093129: Nicolelis

-U. S. Patent Publication 20020175643: Gokturk

-U. S. Patent 5626332: Phillips

-U. S. Patent 5719480: Bock

-U. S. Patent 5796920: Hyland

17. Claims 1-12 are rejected.

Correspondence Information

18. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner Peter Coughlan, whose telephone number is (571) 272-5990. The Examiner can be reached on Monday through Friday from 7:15 a.m. to 3:45 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor David Vincent can be reached at (571) 272-3080. Any response to this office action should be mailed to:

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Washington, D. C. 20231;

Hand delivered to:

Receptionist,

Customer Service Window,

Randolph Building,

401 Dulany Street,

Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

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/P. C./

Examiner, Art Unit 2129

Peter Coughlan

5/5/2008

/Joseph P. Hirl/

Primary Examiner, Art Unit 2129